REMARKS

Applicants thank Examiner Nguyen for the courteous discussion of September 4, 2008. During the discussion Applicants' U.S. representative pointed out that Yamanaka is drawn to a process for thin-film semiconductor device whereas the other cited art discloses processes for making and isolating $SiHCl_3$. Applicants' U.S. representative further pointed out that Rodgers discloses that the use of catalytic metals for dehydrohalogenating $SiCl_4$ is discouraged.

The Office rejected the previously presented claims as obvious over the combination of JP '017 (JP 57-118017); Yamanaka (U.S. 6,653,212) and Rodgers (U.S. 3,933,985). The Office relies on JP '017 as evidence that it was known in the art to pass mixtures of hydrogen and silicon tetrachloride over a graphite electrified resistor (see page 3 of the June 13, 2008 Office Action). The Office acknowledges that JP '017 does not disclose the heating element and/or resistance heating device of the present claims (e.g., because JP '017 discloses only a graphite resistor). The Office relies on Yamanaka for the teaching that gaseous mixtures of hydrogen and silicon tetrachloride may be passed over resistors made of materials other than graphite.

Applicants submit that the rejection is unsupportable because the Office relied on an improper combination of non-analogous art. In this regard Applicants draw the Office's attention to M.P.E.P. §2141.01(a)(II) which states, in part:

> While Patent Office classification of references and the cross-references in the official search notes of the class definitions are some evidence of "nonanalogy" or "analogy", respectively, the court has found "the similarities and differences in structure and function of the invention to carry far greater weight. (citations omitted)"...

Applicants submit that the inventions disclosed in Yamanaka and JP '017 are so different in structure and function that the cited references are in non-analogous arts.

For example, JP '017 describes an invention whose purpose is to manufacture $SiHCl_3$ by passing hydrogen and silicon tetrachloride through a reactor that contains an electrified graphite resistor. In contrast, Yamanaka discloses an invention for making thin-film semiconductor devices. Where the function of the JP '017 invention is to "manufacture $SiHCl_3$", the function of Yamanaka is to prepare a thin-film semiconductor device. Such processes are substantially different for several reasons. For example, the process of JP '017 forms a gaseous product (i.e., $SiHCl_3$) whereas the process of Yamanaka forms a solid thin film. Applicants submit that such differences in function are evidence that JP '017 and Yamanaka are in non-analogous art and thus their combination to render the present invention obvious is improper.

Moreover, the apparatus used in JP '017 is substantially different than the apparatus used in Yamanaka. The difference in structure of the Yamanaka apparatus and the JP '017 apparatus is tied to the function of the respective inventions. The product formed in the JP '017 apparatus must leave the reactor such that the product, i.e., $SiHCl_3$, can be isolated. In contrast, the product of the Yamanaka invention must stay inside the reactor, i.e., in the form of a solid Si film formed on a substrate.

Further still, the functions of the respective JP '017 and Yamanaka inventions are substantially different with respect to the scale on which they are carried out. The JP '017 reference describes a method and apparatus by which $SiHCl_3$ may be manufactured. Applicants submit that those of ordinary skill in the art readily recognize that in order for such an invention to have a useful and economically meaningful purpose the $HSiCl_3$ must be manufactured using sufficient amounts of hydrogen and silicon tetrachloride. Yamanaka is different because a low volume high value end-product is formed; namely, a semiconductor device having silicon layers. Applicants submit that it is readily recognized by those of ordinary skill in the art that the amount of silicon that must be incorporated onto a substrate

in order to form a thin-film semiconductor device is negligible in view of the scale on which a method of manufacturing $SiHCl_3$ must be carried out in order to economically function to form the desired marketable product.

For the reasons set forth above, Applicants submit that those of ordinary skill in the art readily recognize that Yamanaka and JP '017 represent non-analogous art; namely, the art of manufacturing a chemical product $HSiCl_3$ (JP '017) and the art of making a semiconductor device (Yamanaka). The combination of references relied on by the Office is therefore insufficient for forming a *prima facie* case of obviousness and the rejection should be withdrawn.

Applicants further submit the rejection should be withdrawn in view of the cited art's "teaching away". With regard to the use of a metallic catalyst to carry out the hydrodehalogenation of $SiCl_4$ to from $SiHCl_3$, Rodgers discloses the following:

> Another process for obtaining trichlorosilane from silicon in the presence of a catalyst is disclosed in U.S. Pat. No. 2,943,918, Pauls. In the production of silicon for semiconductor purposes, the presence of such catalytic metals is undesirable since the metals can be dopants affecting the electrical characteristics of the semiconductor. Thus, for semiconductor purposes, a reaction in which no catalytic metal appears is highly desirable.

See column 2, lines 9-17 of Rodgers.

Applicants submit that the combination of Rodgers with any of Yamanaka and/or JP '017 is improper at least because Rodgers teaches away from the use of any metal-catalyzed formation of $HSiCl_3$, which is a feature explicitly recited in the present claims. Rodgers makes it clear that metal-based catalysts should not be used when making $HSiCl_3$ from a silicon precursor because the of metallic impurities may form. Applicants submit that those of ordinary skill in the art would not modify Yamanaka according to Rodgers in view of Rodgers' explicit warning regarding the detrimental affects of metal impurities.

Applicants thus submit that the combination of the cited art is not proper for the further reason that Rodgers teaches away from such a combination and/or Rodgers teaches those of skill in the art that there would be no expectation of success in any such combination.

Applicants submit that the presently pending dependent claims are further patentable over the art of record. For example, new dependent Claim 23 and previously presented Claim 6 recite certain pressures under which the process of Claim 1 is carried out. Yamanaka does not disclose or suggest any process carried out at the pressures recited in the aforementioned claims, in fact, to the contrary, the process of Yamanaka is carried out under a vacuum (see the Abstract of Yamanaka which discloses a process and apparatus having a vacuum chamber). The vacuum chamber of Yamanaka is designed to be used at very low pressure such as 10^{-8} Pa which is about 10^{-15} bar (i.e., 1 Pa = 0.00001 bar). See column 31, lines 11-19 for a description of the pressure capabilities of the Yamanaka vacuum chamber. At column 2, lines 53-61, Yamanaka discloses a vacuum chamber that is operated at a pressure of 1-20 Pa (about 0.002 bar).

Applicants submit that those of ordinary skill in the art would have no reason to believe that any process carried out in the vacuum chamber of Yamanaka could successfully be modified to be carried out in the apparatus and/or processes of Rodgers or JP '017. The respective references operate in entirely different pressure realms which necessarily has an effect on gas-phase reactivity. Those of ordinary skill in the art would thus have no reason to believe that the reactivity observed in the vacuum chamber of Yamanaka would occur or take place in the processes of Rodgers and/or JP '017, especially in view of the explicit requirement for certain pressure ranges in Claim 6 and new Claim 23.

Applicants further draw the Office's attention to Claim 7 which recites a particular space velocity of the gaseous feed mixture during the heating of the presently claimed

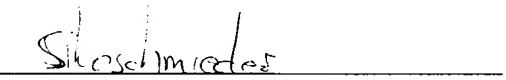
invention. Not only is the process of Yamanaka carried out in an entirely different pressure realm than the processes of Rodgers and JP '017, the process of Yamanaka is carried out at substantially different throughputs. For example, Yamanaka discloses a process in which a silicon layer is formed on a substrate. The silicon substrate has dimensions of 500 x 600 mm. A silicon layer formed by the process of Yamanaka on the substrate has a thickness of 0.5 to 1.1 mm (see column 50, line 62 – column 51, line 21 of Yamanaka). Applicants submit that the amount of silicon in a thin film formed by the process of Yamanaka is so small as to fail to suggest the space velocities recited in Claim 7. Therefore, not only does the presently claimed invention operate in an entirely different pressure realm, the presently claimed invention further operates in an entirely different throughput realm.

Those of ordinary skill in the art would thus further have no reason to believe that any teaching of Yamanaka is applicable to the processes of Rodgers and/or JP '017.

For the reasons discussed above in detail, Applicants submit that the rejection over the combination of JP '017, Yamanaka and Rodgers is not supportable and should be withdrawn. Applicants respectfully request withdrawal of the rejection and the allowance of all now-pending claims.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Stefan U. Koschmieder
Registration No. 50,238

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/07)